Data Evaluation Report on the Acute Dietary Toxicity of Transfluthrin Technical to Bobwhite Quail (*Colinus virginianas*)

PMRA Submission Number {.....} EPA MRID Number 49617840

Data Requirement:	PMRA Data Code	{.....}
	EPA DP Barcode	436376
	OECD Data Point	{.....}
	EPA MRID	49617840
	EPA Guideline	850.2200

Test material: Transfluthrin **Purity:** 97.7%
Common name: Transfluthrin Technical
Chemical name: IUPAC ,3,5,6-tetrafluorobenzyl (1*R*,3*S*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate; or 2,3,5,6-tetrafluorobenzyl (1*R*)-*trans*-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate
CAS name: (2,3,5,6-tetrafluorophenyl)methyl (1*R*,3*S*)-3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate
CAS No.: 118712-89-3
Synonyms: None

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Staff Scientist, CDM/CSS-Dynamac JV
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Date: 1/30/2017

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Date: {.....}

Reference/Submission No.: {.....}

Company Code	{.....}	[For PMRA]
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Use Site Category:	{.....}	[For PMRA]
EPA PC Code	129140	

Date Evaluation Completed: 11-09-2017

CITATION: Christ, M. and Moore, S. 2016. Toxicity of Transfluthrin Technical During a Dietary LC_{50} with the Northern Bobwhite Quail (*Colinus virginianas*). Unpublished study performed by SynTech Research Laboratory, Stilwell, Kansas, USA. Laboratory Study No. 007SRUS15C122. Study sponsored by Bayer CropScience, Research Triangle Park, North Carolina, USA. Study initiated October 30, 2015 and completed February 9, 2016.

DISCLAIMER: This document provides guidance for EPA and PMRA reviewers on how to complete a data evaluation record after reviewing a scientific study concerning the acute dietary toxicity of a pesticide to avian species. It is not intended to prescribe conditions to any external party for conducting this study nor to establish absolute criteria regarding the assessment of whether the study is scientifically sound and whether the study satisfies any applicable data requirements. Reviewers are expected to review and to determine for each study, on a case-by-case basis, whether it is scientifically sound and provides sufficient information to satisfy applicable data requirements. Studies that fail to meet any of the conditions may be accepted, if appropriate; similarly, studies that

meet all of the conditions may be rejected, if appropriate. In sum, the reviewer is to take into account the totality of factors related to the test methodology and results in determining the acceptability of the study. This Data Evaluation Record may have been altered by the Environmental Fate and Effects Division subsequent to signing by CDM/CSS-Dynamac JV personnel.

EXECUTIVE SUMMARY:

The acute dietary toxicity of Transfluthrin technical to 10 day-old Northern Bobwhite Quail (*Colinus virginianas*) was assessed over 8 days. Transfluthrin was administered to the birds in the diet at nominal concentrations of 0 (control), 313, 625, 1250, 2500, and 5000 mg ai/kg diet. Mean-measured concentrations were <20 (<LOQ, control), 307, 620, 1245, 2513, and 4905 mg ai/kg diet, respectively. No mortalities or clinical signs of toxicity were observed in the control or treatment groups. Mean body weights in 1245 and 4905 mg ai/kg diet groups were lower than the control on Days 5 and 8, and appeared to be treatment related. Similarly, reductions in body weight gains were observed in in the 1245 and 4905 mg ai/kg diet groups compared to the control. Reductions in food consumption were observed in 4905 mg ai/kg diet group compared to the control. The 8-day acute dietary LC_{50} was estimated as >4905 mg ai/kg diet.

According to the US EPA classification, Transfluthrin technical would be classified as **practically nontoxic** to quail on an acute dietary basis.

This study is scientifically sound and is classified as acceptable.

Results Synopsis

Test Organism Size/Age (Weight range): 10 days old; 24.5 to 31.9 g

LC_{50}: >4905 mg ai/kg diet 95% C.I.: N/A
Slope: N/A 95% C.I.: N/A

Endpoint(s) affected: None
Most sensitive endpoints: None

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: The study was based on procedures outlined in U.S. EPA OCSPP Guideline 850.2200 and OECD Guideline 205. No deviations from U.S. EPA OCSPP Guideline 850.2200 were observed.

COMPLIANCE: Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. This study was conducted in accordance with the U.S. EPA GLP Standards (40 CFR 160) with the exceptions of the data collected for bird feed and corn oil screening analyses and the data collected for public water analysis.

A. MATERIALS:

1. Test Material: Transfluthrin technical

Description: White solid

Lot No./Batch No.: AE0035474-01-07

Purity: 97.7%

Stability of Compound Under Test Conditions: The compound was stable under test conditions. The measured test concentrations on Day 5 were 92-100% of Day 0 samples for all treatment groups (reviewer-calculated). The mean measured concentrations were 98-101% of nominal.

Storage Conditions of Test Chemicals: Ambient.

Physicochemical properties of Transfluthrin technical.

Parameter	Values	Comments
Water solubility at 20°C	Not reported	
Vapor pressure	Not reported	
UV absorption	Not reported	
pKa	Not reported	
Kow	Not reported	

(OECD recommends water solubility, stability in water and light, pKa, Pow, and vapor pressure of test compound)

2. Test organism:

Species: Northern Bobwhite Quail (*Colinus virginianas*)
Age at study initiation: 10 days old
Weight at study initiation (range): 24.5 to 31.9 g (Day 0 weights)
Source: Quail Ranch, Wardville, Oklahoma, USA

B. STUDY DESIGN:

1. Experimental Conditions

a. Range-finding study: No range-finding study was reported.

b. Definitive study:

Table 1: Experimental Parameters

Parameter	Details	Remarks *Criteria*
Acclimation Period: Conditions (same as test or not):	5 days Same as test	

Parameter	Details	Remarks *Criteria*
Feeding: Health (any mortality observed):	Teklad Starter Ration basal diet and tap water were available *ad libitum*. Healthy birds with no abnormal clinical signs were used in study. Two mortalities occurred during acclimation (<1% mortality).	
Pen size and construction materials:	Galvanized steel brooders constructed of stainless steel wire grid and stainless steel sheeting, measuring 91 cm length x 76 cm width x 25 cm height	Cage board bedding was changed at least twice a week during the study. *Recommended pen size is about 35 x 155 x 24 cm*
Test duration:	8 days (5 days exposure and 3 days post-exposure)	*Recommended test duration is 5 days with treated feed and at least 3 days observation with "clean" feed.*
Test concentrations Nominal: Measured:	0 (control), 313, 625, 1250, 2500, and 5000 mg ai/kg diet <20 (<LOQ, control), 307, 620, 1245, 2513, and 4905 mg ai/kg diet	*Five or six test concentrations should be used in a geometric scale, unless the LC_{50} > 5000 mg ai/kg diet.*
Solvent/vehicle, if used Type: Amount:	Acetone and corn oil <2% by weight	*Recommended solvents include distilled water, corn oil, propylene glycol, 1% carboxymethylcellulose, or gum arabic. The solvent should not be more than 2%.*
Diet preparation and feeding:	The test material was dissolved in acetone and mixed with corn oil. The mixture was added to test diet and blended with Hobart mixer. Test diets were mixed once during the study and stored frozen until use. Test diets were presented to the birds starting on Day 0.	*The control group should be tested with a diet containing the maximum amount of vehicle used in treated diets.*
Feed withholding period:	None	
Stability and homogeneity of test material in the diet determined (Yes/No)	Yes	

Parameter	Details	Remarks *Criteria*
Number of birds per replicate/group Negative control: Vehicle control: Treated:	 N/A 10 10/level	*The recommended number of birds per replicate is a minimum of ten.*
Number of replicates/group Negative control: Vehicle control: Treated:	 N/A 1 1/level	
Test conditions Temperature: Relative humidity: Photoperiod:	 23.2°C (mean) 52% (mean) 14 hrs light/10 hrs dark	The light intensity was 60 lux. *Recommended brooder temperature is about 35°C (95°F)* *Recommended room temperature is 22-27°C (71-81°F)* *Recommended relative humidity is 30-80%* *Recommended photoperiod is a minimum of 14 hours of light.*
Reference chemical, if used	N/A	

2. Observations:

Table 2: Observations

Parameters	Details	Remarks
Parameters measured:	- Mortality - Clinical signs of toxicity - Body weight - Food consumption	
Indicate the stability and homogeneity of test chemical in the diet	The stability was reviewer-calculated based from Day 0 and Day 5 test diet samples from all treatment groups. Homogeneity was determined for 313 and 5000 ppm test diets using top, middle and bottom samples from mixing bowl. For stability, the Day 5 measured test concentration samples were 92-100% of Day 0 samples for all treatment groups.	

Parameters	Details	Remarks
	For homogeneity, the measured 313 and 5000 ppm diet samples were 100-101% of nominal (RSD=2.48 to 3.16%).	
Indicate if the test material was regurgitated	No regurgitation was reported.	
Treatments on which necropsies were performed	Necropsies were performed on all surviving birds.	
Observation intervals:	Birds were observed for mortality and clinical signs of toxicity three times on Day 0 (1, 2, and 3 hours after diet administration), twice daily on weekdays up to Day 7, and once on Day 8. Individual body weights were measured on Days 0, 5, and 8. Body weight change was determined for Days 0-5, Days 5-8, and Days 0-8. Food consumption was determined daily from Days 1 to 8, and overall for Days 0-5, Days 5-8, and Days 0-8.	
Were raw data included?	Yes	

II. RESULTS AND DISCUSSION:

A. MORTALITY:

No mortalities were observed in the control or treatment groups. The acute dietary LC_{50} was estimated as >4905 mg ai/kg diet.

Table 3: Effect of Transfluthrin technical on Mortality in Bobwhite Quail (*Colinus virginianas*).[a]

Mean-measured (and Nominal) Concentrations (mg ai/kg diet)	No. of birds per treatment	Cumulative mortality					
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 8
Control	10	0	0	0	0	0	0
307 (313)	10	0	0	0	0	0	0
620 (625)	10	0	0	0	0	0	0
1245 (1250)	10	0	0	0	0	0	0
2513 (2500)	10	0	0	0	0	0	0
4905 (5000)	10	0	0	0	0	0	0
NOAEC	4905 mg ai/kg diet						
LC_{50} (95% C.I.)	>4905 mg ai/kg diet						

a Data obtained from Table 2 on page 21 of study report.

B. SUB-LETHAL TOXICITY ENDPOINTS:

No clinical signs of toxicity were observed in the control or treatment groups during the study.

During the exposure period (Days 0-5), significant reductions in body weight gains were observed in the ≥1245 mg ai/kg diet groups compared to the control. During the post-exposure period (Days 5-8), significant reductions in body weight gains were observed in the 4905 mg ai/kg diet groups compared to the control. Overall (Days 0-8), significant reductions in body weight gains were observed in the 1245 and 4905 mg ai/kg diet groups compared to the control. Mean body weights in 1245 and 4905 mg ai/kg diet groups were significantly lower than the control on Days 5 and 8.

Significant reductions in food consumption were observed in the 4905 mg/kg group compared to the control during the exposure period (Days 1-5), post-exposure period (Days 5-8), and overall (Days 0-8). Mean daily dietary doses were 52, 100, 191, 403, and 673 mg ai/kg bw/day in the mean-measured 307, 620, 1245, 2513, and 4905 mg ai/kg diet levels, respectively.

Table 4: Sublethal Effects of Transfluthrin technical on Bobwhite Quail (*Colinus virginianas*).

	Mean Body Weight (and Change), g ± SD			
Mean-measured (and Nominal) Concentrations (mg ai/kg diet)	**Day 0**	**Day 5 (Days 0-5 change)**	**Day 8 (Days 5-8 change)**	**Days 0-8 change**
Control	27.3±1.7	44.1±3.5 (16.8±2.7)	55.9±4.4 (11.8±1.5)	28.6±3.6
307 (313)	27.5±1.7	43.4±3.5 (15.9±2.0)	55.2±4.5 (11.9±1.4)	27.8±3.0
620 (625)	27.6±1.8	41.1±3.6 (13.5±2.7)	52.5±4.3 (11.5±1.1)	25.0±3.6
1245 (1250)	27.6±2.1	37.5±3.9* (9.9±2.3*)	49.2±4.6* (11.7±1.6)	21.6±3.6**
2513 (2500)	27.3±1.7	39.3±4.8 (12.0±4.2*)	52.8±6.0 (13.5±1.7)	25.5±5.4
4905 (5000)	27.3±1.6	31.6±7.5* (4.3±6.9*)	39.5±10.2* (8.0±3.1**)	12.3±9.8**
NOAEC	620 mg ai/kg diet			
LOAEC	1245 mg ai/kg diet			
	Mean Food Consumption			
Mean-measured (and Nominal) Concentrations (mg ai/kg diet)	**Exposure Period Days 1-5 (g/bird/day ± SD)**	**Post-exposure Period Days 5-8 (g/bird/day± SD)**	**Overall Days 0-8 (g/bird/day± SD)**	**Mean daily dietary dose (mg/kg bw/day)**
Control	6.3±0.5	9.9±0.8	7.6±2.0	NA
307 (313)	6.0±0.6	7.8±0.3	6.7±1.1	52
620 (625)	5.5±0.4	7.2±0.7	6.2±1.0	100
1245 (1250)	5.0±0.5	7.0±0.2	5.7±1.1	191
2513 (2500)	5.3±0.7	8.0±0.3	6.4±1.5	403
4905 (5000)	4.0±0.8*	5.6±0.2*	4.6±1.0*	673
NOAEC	2513 mg ai/kg diet			
LOAEC	4905 mg ai/kg diet			

a Data obtained from Tables on pages 16-18 of study report.
* Statistically significant difference compared to the control (Dunnett's test for body weight, empirically estimated for food consumption).
** Statistically significant difference compared to the control (Steele's One-Rank test for body weight).
NA=Not applicable

C. REPORTED STATISTICS:

The LC_{50} (median lethal concentration) was not calculated because no treatment related mortalities were observed. The means and standard deviations for body weights and feed consumption data were calculated in Microsoft® Excel. Due to the fact that there were no replicates for feed consumption, comparisons were limited to empirical analyses. Body weight and growth data were subjected to statistical analysis including normality using the Chi-square test ($\alpha = 0.01$) and homogeneity of variance using the Levene's test ($\alpha = 0.05$). Parametric procedures involved subjecting body weight data to a standard one-way analysis of variance (ANOVA) followed by a means comparison using a one-tailed Dunnett's test ($\alpha = 0.05$), where the means of the treatment groups were compared to control means. The statistical analyses on body weight were conducted using TOXSTAT software (version 3.4), and the results are reported as mean-measured concentrations.

D. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: The reviewer entered the mortality, body weight change, and regurgitation data into the database/program CETIS version 1.8.7.12, with backend settings implemented by EFED on 10/20/15. The mean-measured test concentrations were used. The LD_{50} was empirically determined by the reviewer due to a complete lack of mortality in this study.

Statistical Method:

LC_{50}: >4905 mg ai/kg diet 95% C.I.: N/A
Probit Slope: N/A 95% C.I.: N/A

E. STUDY DEFICIENCIES:

No deviations or deficiencies from the OCSPP 850.2200 guidelines were noted.

F. REVIEWER'S COMMENTS:

The reviewer's results generally agree with the study author's. Both the study author and the reviewer estimated the LD_{50} to be >4905 mg ai/kg diet based on a lack of mortality.

The in-life phase of the definitive study was conducted November 5-13, 2015.

G. CONCLUSIONS:

This study is scientifically sound and is classified as acceptable. No mortalities or clinical signs of toxicity were observed in the control or treatment groups. Mean body weights in 1245 and 4905 mg ai/kg diet groups were lower than the control on Days 5 and 8, and appeared to be treatment-related. Similarly, reductions in body weight gains were observed in in the 1245 and 4905 mg ai/kg diet groups compared to the control. The LC_{50}, based on a lack of mortality, was >4905 mg ai/kg diet.

LC_{50}: >4905 mg ai/kg diet 95% C.I.: N/A
Slope: N/A 95% C.I.: N/A

Endpoint(s) affected: None
Most sensitive endpoints: None

III. REFERENCES: None; other than standard guidelines or methodologies.